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EXAMINER

SONG, MATTHEW J

ART UNIT

PAPER NUMBER

1765

10

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/904,129

Applicant(s)

UEDA, TETSUZO

Examiner

Matthew J Song

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 16-51 is/are pending in the application.
- 4a) Of the above claim(s) 21,22 and 26-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-20,23-25 and 31-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Claim Objections*

3. Claim 33 is objected to because of the following informalities: Claim 33 is dependent on a non-elected claim. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 16-18 and 24-25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanaoka et al (US 5,804,839) in view of Agostinelli et al (US 4,833,103).

Hanaoka et al discloses a method of forming a III-V nitride compound semiconductor device, note entire reference, where a AlN buffer layer 42 is formed on a SiC substrate 41 by MOCVD to a thickness of 30 nm at a substrate temperature of 1050°C and on the AlN buffer layer is formed by MOCVD a n-type GaN layer 13, n-type AlGaIn layer 14, InGaIn:Zn layer 15, a p-type AlGaIn layer 16 and a p-type GaN layer 17. Hanaoka et al also discloses a p-type GaN layer 18 formed by molecular beam epitaxy (Example 2).

Hanaoka et al discloses all of the limitations of claim 16, except spreading a liquid comprising group III elements and nitrogen on a substrate and coating the substrate with a thin film comprising group III elements and nitrogen by spinning at selected rotation speeds.

Art Unit: 1765

In a method of depositing a III-V layer on a substrate, note entire reference, Agostinelli et al teaches applying a precursor of a III-V compound, where the preferred group III elements are boron, aluminum, indium or gallium and the preferred group V elements are nitrogen, phosphorous and arsenic (col 6, ln 1-65) to a SiC substrate (col 5, ln 1-67). Agostinelli et al also teaches spin coating by applying a small amount of coating composition to the substrate and rotating the substrate (col 9, ln 1-67). Agostinelli et al also teaches heating the substrate and coating to a temperature above 200°C in an inert or reducing atmosphere, such as nitrogen, argon, hydrogen or mixtures of these or similar gases (col 10, ln 1-67). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Hanaoka et al with Agostinelli et al because lower processing temperatures are required, which reduces operating costs (col 3, ln 35-65).

Referring to claim 17, the combination of Hanaoka et al and Agostinelli et al teaches annealing in a nitrogen atmosphere.

Referring to claim 18, the combination of Hanaoka et al and Agostinelli et al teach forming a buffer layer by spinning and annealing, thereafter forming subsequent layers on the buffer layer.

Referring to claim 24-25, the combination of Hanaoka et al and Agostinelli et al teaches forming layers by MOVCD and a forming a layer 18 by molecular beam epitaxy, the examiner interprets this to read on claim 25 as two methods of film deposition in sequence.

Referring to claim 44, the combination of Hanaoka et al and Agostinelli et al teach annealing at a temperature greater than 200°C. Overlapping ranges are held to be obvious (MPEP 2144.05).

Referring to claim 45, the combination of Hanaoka et al and Agostinelli et al teaches forming a buffer layer by spin coating and annealing and subsequent processing to form a device.

Referring to claim 46-47, the combination of Hanaoka et al and Agostinelli et al teach annealing in nitrogen.

6. Claims 16-18, 31-32 and 44-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishio et al (US 5,786,606) in view of Agostinelli et al (US 4,833,103).

Nishio et al discloses a silicon substrate with a silicon-carbide surface layer thereon grown by MOCVD at a temperature of 600°C (col 4, ln 1-67 and Example 1) and AlGaN buffer layer, thereon by MOCVD and growing an n-type GaN layer on the buffer layer, note entire reference.

Nishio et al discloses all of the limitations of claim 16, except spreading a liquid comprising group III elements and nitrogen on a substrate and coating the substrate with a thin film comprising group III elements and nitrogen by spinning at certain rotation speeds.

In a method of depositing a III-V layer on a substrate, note entire reference, Agostinelli et al teaches applying a precursor of a III-V compound, where the preferred group III elements are boron, aluminum, indium or gallium and the preferred group V elements are nitrogen, phosphorous and arsenic (col 6, ln 1-65) to a SiC substrate (col 5, ln 1-67). Agostinelli et al also teaches spin coating by applying a small amount of coating composition to the substrate and rotating the substrate (col 9, ln 1-67). Agostinelli et al also teaches heating the substrate and coating to a temperature above 200°C in an inert or reducing atmosphere, such as nitrogen, argon, hydrogen or mixtures of these or similar gases (col 10, ln 1-67). It would have been

Art Unit: 1765

obvious to a person of ordinary skill in the art at the time of the invention to modify Nishio et al with Agostinelli et al because lower processing temperatures are required, which reduces operating costs (col 3, ln 35-65).

7. Claims 16-18, 33 and 44-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furushima (US 5,815,520) in view of Agostinelli et al (US 4,833,103).

Furushima discloses a ZnO, zinc oxide, epitaxial layer on a silicon substrate **9** and forming a III-V, an InGaAlN, buffer layer **10** thereon and forming a III-V n-type cladding layer **4** on the buffer layer, where the layers are formed by MOCVD at a temperature of 1000°C, note entire reference.

Furushima discloses all of the limitations of claim 16, except spreading a liquid comprising group III elements and nitrogen on a substrate and coating the substrate with a thin film comprising group III elements and nitrogen by spinning at certain rotation speeds.

In a method of depositing a III-V layer on a substrate, note entire reference, Agostinelli et al teaches applying a precursor of a III-V compound, where the preferred group III elements are boron, aluminum, indium or gallium and the preferred group V elements are nitrogen, phosphorous and arsenic (col 6, ln 1-65) to a SiC substrate (col 5, ln 1-67). Agostinelli et al also teaches spin coating by applying a small amount of coating composition to the substrate and rotating the substrate (col 9, ln 1-67). Agostinelli et al also teaches heating the substrate and coating to a temperature above 200°C in an inert or reducing atmosphere, such as nitrogen, argon, hydrogen or mixtures of these or similar gases (col 10, ln 1-67). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Furushima

Art Unit: 1765

with Agostinelli et al because lower processing temperatures are required, which reduces operating costs (col 3, ln 35-65).

Referring to claim 33, the combination of Furushima and Agostinelli et al teaches a Si substrate with a ZnO coating.

8. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanaoka et al (US 5,804,839) or Furushima (US 5,815,520) or Nishio et al (US 5,786,506) in view of Agostinelli et al (US 4,833,103) as applied to claims 16-18 above, and further in view of Narumi et al (US 4,990,323).

The combination of Hanaoka et al and Agostinelli et al or the combination of Furushima and Agostinelli et al or the combination of Nishio et al and Agostinelli et al teaches all of the limitation of claim 19, as discussed previously, except the gas atmosphere comprises ammonia.

In a method of treating a semiconductor material, Narumi et al teaches a heat treatment performed in a current of a reducing gas such as, hydrogen, carbon monoxide or ammonia or a mixed gas consisting of a reducing gas and an inert gas such as nitrogen or argon (col 3, ln 1-40). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Hanaoka et al and Agostinelli et al or the combination of Furushima and Agostinelli et al or the combination of Nishio et al and Agostinelli et al with Narumi et al because ammonia is a known equivalent to a reducing gas and substitution of a known equivalent for the same purpose is obvious (MPEP 2144.06).

Art Unit: 1765

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanaoka et al (US 5,804,839) or Furushima (US 5,815,520) or Nishio et al (US 5,786,606) in view of Agostinelli et al (US 4,833,103) as applied to claims 16-18 above, and further in view of Iaconi et al (US 6,048,790).

The combination of Hanaoka et al and Agostinelli et al or the combination of Furushima and Agostinelli et al or the combination of Nishio et al and Agostinelli et al teaches all of the limitation of claim 19, as discussed previously, except the gas atmosphere comprises radical nitrogen atoms.

In a deposition of a thin film using a reducing ambient, Iaconi et al teaches a reducing ambient of hydrogen gas, nitrogen gas or reactive nitrogen such as plasma, i.e. radical nitrogen atoms (col 5, ln 1-65). Iaconi et al also teaches a reactive nitrogen plasma may be sufficiently reducing without heating of the substrate (col 5, ln 15-30). It would have been obvious to a person of ordinary skill in the art at the time of the invention the combination of Hanaoka et al and Agostinelli et al or the combination of Furushima and Agostinelli et al or the combination of Nishio et al and Agostinelli et al with Iaconi et al because radical nitrogen is a known equivalent to a reducing gas and substitution of a known equivalent for the same purpose is obvious (MPEP 2144.06) and a reducing ambient can be produced without heating, which reduces operating costs.

10. Claim 34-36, 38-42 and 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furushima (US 5,815,520) in view of Ito et al (US 5,699,035).



Furushima discloses a ZnO epitaxial layer buffer layer 2 on a sapphire 1 or silicon 9 substrate and a InGaAlN buffer layer 3 and an n-type InGaAlN cladding layer 4 grown on the ZnO layer, where the layers are formed by MOCVD, metal organic chemical vapor deposition, to form a pn junction, note entire reference.

Furushima does not disclose spreading a liquid comprising metal elements and oxygen on a substrate and coating the substrate with a thin film by spinning at certain rotation speeds, as interpreted by the examiner.

In a method of forming a ZnO thin film, note entire reference, Ito et al teaches a conventional spin coating, where an eyedropper is used to deposit a precursor solution with excess liquid being removed through the rotation yielding a solid metal oxide layer on to a silicon substrate or sapphire substrate (col 5, ln 1-40 and col 3, ln 40-60). Ito et al also teaches a precursor solution of metal alkoxides i.e. a liquid comprising metal and oxygen (col 4, ln 20-65). Ito et al also teaches annealing a metal oxide residue in an oxygen environment at 400-1000°C (col 5, ln 45-67 and Example 4). Ito et al also teaches ZnO layer with a grain size of less than 300 nm (col 2, ln 1-67). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Furushima with Ito et al to form a ZnO layer with improved crystallinity, thereby improving the crystallinity of layers grown thereon (col 2, ln 25-55).

Referring to claim 35-36 and 38, the combination of Furushima and Ito et al teaches annealing a ZnO layer in oxygen prior to forming additional layers.

Referring to claim 37, the combination of Furushima and Ito et al teaches an oxygen environment. The combination of Furushima and Ito et al does not teach a H<sub>2</sub>O gas atmosphere. It would have been obvious to a person of ordinary skill in the art at the time of the invention to

Art Unit: 1765

modify the combination of Furushima and Ito et al by using a H<sub>2</sub>O atmosphere because H<sub>2</sub>O is a known equivalent to oxygen as a oxygen environment and substitution of a known equivalent for the same purpose is obvious (MPEP 2144.06)

Referring to claim 39-40, the combination of Furushima and Ito et al teaches from a zinc oxide layer on a Si or sapphire substrate.

Referring to claim 41, the combination of Furushima and Ito et al teaches forming a pn junction.

Referring to claim 42, the combination of Furushima and Ito et al teaches a MOCVD process.

Referring to claim 48, the combination of Furushima and Ito et al teaches annealing at 400-1000°C. Overlapping ranges are held to be obvious (MPEP 2144.05).

Referring to claim 49, the combination of Furushima and Ito et al teaches forming a device after forming a ZnO buffer layer by spin coating and annealing.

Referring to claim 50-51, the combination of Furushima and Ito et al teaches annealing in an oxygen environment.

11. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furushima (US 5,815,520) in view of Ito et al (US 5,699,035) as applied to claims 34-36 above, and further in view of Hofmann et al (US 4,784,975).

The combination of Furushima and Ito et al teaches all of the limitations of claim 37, as discussed previously, except the atmosphere comprises H<sub>2</sub>O.

In a method of annealing, note entire reference, Hofmann et al teaches annealing in an ambient that contains an oxygen containing gaseous species, where suitable oxygen containing species include oxygen and H<sub>2</sub>O (col 3, ln 50-67). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Furushima and Ito et al because H<sub>2</sub>O is a known equivalent to oxygen as an oxygen atmosphere and substitution of a known equivalent for the same purpose is obvious (MPEP 2144.06).

12. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Furushima (US 5,815,520) in view of Ito et al (US 5,699,035) as applied to claims 34-36 and 38-42 above, and further in view of Hanaoka et al (US 5,804,839).

The combination of Furushima and Ito et al teaches all of the limitations of claim 43, as discusses previously, except the alloy film is grown by a sequential combination of more than two growth methods selected from the group consisting of MOCVD, MBE and hydride phase epitaxy.

Hanaoka et al teaches a method of forming a III-V nitride compound semiconductor device, note entire reference, where a AlN buffer layer **42** is formed on a SiC substrate **41** by MOCVD to a thickness of 30 nm at a substrate temperature of 1050°C and on the AlN buffer layer is formed by MOCVD a n-type GaN layer **13**, a n-type AlGaIn layer **14**, a InGaIn:Zn layer **15**, a p-type AlGaIn layer **16** and a p-type GaN layer **17**. Hanaoka et al also teaches a p-type GaN layer **18** formed by molecular beam epitaxy at a temperature between 150°C and 400°C (Example 2), this is interpreted to read on applicant's limitation of a sequential combination of two growth methods. Hanaoka et al also teaches a p-type GaN layer **18** formed by MOCVD at a

Art Unit: 1765

temperature between 350° and 600°C (Example 1). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Furushima and Ito et al with Hanaoka et al because MBE operates at a lower temperature, thereby reducing operating costs.

### ***Response to Arguments***

13. Applicant's arguments filed 1/22/2003 have been fully considered but they are not persuasive.

In response to applicant's arguments against the references individually (pg 8), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Hanaoka et al, Nishio et al or Furushima et al teach forming a buffer layer of a group III-V nitride layer and growing a III-V nitride layer on the buffer layer. The method of forming the III-V layer by spin coating is taught by Agostinelli et al. Therefore, the combination of Hanoka et al, Nishio et al or Furushima et al and Agostinelli et al teach forming a nitride layer on a spin coated buffer layer. Furthermore, Agostinelli et al teaches further steps are undertaken to produce a desired end product, such as a semiconductor device and these steps can be carried out in any conventional manner for acting on conventional III-V compound coatings (col 11, ln 5-20). This is a teaching that the spin coating layer can be used as a buffer layer used in the production of a semiconductor device, as taught by Hanoka et al, Nishio et al or Furushima et al.

In response to applicant's argument that the spin coated layer of Agostinelli et al is not a buffer layer (pg 9) is noted but is not found persuasive. Agostinelli et al teaches further steps are undertaken to produce a desired end product, such as a semiconductor device and these steps can be carried out in any conventional manner for acting on conventional III-V compound coatings (col 11, ln 5-20). This is a teaching that the spin coating layer can be used as a buffer layer used in the production of a semiconductor device, as taught by Hanoka et al, Nishio et al or Furushima et al.

In response to applicant's argument that the prior art teaches away from spin coating because the prior prefers a MOCVD method (pg 9) is noted but has not been found persuasive. Nishio et al teaches MOCVD is **preferred** over other available techniques, however a preferred method does not constitute a teaching away. Furthermore, Furushima et al teaches a first embodiment where crystal growth was obtained by MOCVD, however it is also possible to obtain InGaAlN having a high crystallinity by the introduction of a ZnO buffer layer using **other crystal growth methods** such as molecular beam epitaxy, etc (col 5, ln 20-35). Therefore the prior art is not as limited as suggested by applicant. Furthermore, Agostinelli et al teaches spin coating is advantageous over MOCVD (col 1, ln 25-50).

In response to applicant's argument that the examiner has not provided objective evidence from the prior art that suggests the desirability of the proposed combination is noted but is not found persuasive. The lower operating temperatures taught by Agostinelli et al and it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the prior art with Agostinelli et al's spin coating method to reduce operating cost.

Art Unit: 1765

Furthermore, Agostinelli et al teaches spin coating is advantageous over MOCVD (col 1, ln 25-50).

In response to applicant's arguments against the references individually (pg 9), one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Agostinelli et al is not relied upon as a teaching of an III-V nitride buffer layer obtained by spin coating. Agostinelli et al is solely relied upon as a method of growing III-V nitride layers. Hanaoka et al, Nishio et al or Furushima et al teach the buffer layer.

In response to applicant's argument that the cited prior art does not recognize using a spin coating for a buffer layer so as to help reduce crystal defects/dislocations in a nitride alloy film (pg 10) is noted but not found persuasive. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning (pg 10), it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to applicant's argument that Ito et al does not recognize using a spin coating for a buffer layer so as to help reduce crystal defects/dislocations in a nitride alloy film (pg 13) is noted but not found persuasive, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

In response to applicant's argument that the cited prior art, Furushima, suggest using only MOCVD for buffer layers in III-V devices has been noted but has not been found persuasive. Furushima teaches a first embodiment where crystal growth was obtained by MOCVD and other crystal growth methods are acceptable (col 5, ln 20-35). Therefore the prior art is not as limited as suggested by applicant.

In response to applicant's argument that Ito et al is not related to the problems associated with epitaxial growth of III-V alloys, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Ito et al teaches an alternative method of depositing ZnO. Furthermore, spin coating and MOCVD are well known in the art to be equivalent methods of deposition of ZnO, as evidenced by Enomoto et al (US 5,227,011) below.

In response to applicant's argument that Ito et al does not attribute any of the benefits of Ito's disclosure to spin coating is noted but is not found persuasive. Ito et al's disclosure teaches depositing a zinc oxide film by spin coating and annealing to produce crystal grains of 20nm to

Art Unit: 1765

30 nm, note column 5, line 10 to column 6, line 45. The improved crystallinity, the small crystal grains, of the ZnO film is a result of Ito's method of spin coating and annealing.

### ***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Enomoto et al (US 5,227,011) teaches forming a ZnO layer by multiple equivalent methods, which include MOCVD, MBE and spin coating (col 9, ln 35-55)

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.



Art Unit: 1765


16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on 703-308-3868. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song  
Examiner  
Art Unit 1765

MJS  
April 1, 2003

  
BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700